

Software Engineering Methodology

Appendix C **Conducting Structured Walkthroughs**

Purpose:	This process guide describes how to conduct a structured walkthrough during the lifecycle stages of software engineering projects, regardless of hardware platform.
Reference:	Yourdon, Edward, <i>Structured Walkthroughs</i> , New York, New York: Yourdon, Inc., 1978.
Organization:	<p>This process guide consists of the following sections:</p> <ul style="list-style-type: none"> • Overview • Responsibilities Before the Walkthrough • Responsibilities During the Walkthrough • Responsibilities After the Walkthrough • Additional Activities After the Walkthrough • Follow-up Activities • Structured Walkthroughs for Lifecycle Stages • Structured Walkthroughs for Other Documents • Structured Walkthrough Meeting Record (sample) • Structured Walkthrough Management Summary Report (sample)
Description:	<p>A structured walkthrough is an organized procedure for a group of peers to review and discuss the technical aspects of software development and maintenance work products. The major objectives in a structured walkthrough are to find errors and to improve the quality of the product. Errors typically occur as omissions or contradictions, flaws in logic, or inconsistencies in the work product style (e.g., poorly stated requirements and inefficient code).</p> <p>Structured walkthroughs should not be used to discuss solutions for the errors that are found. <i>The basic purpose of a walkthrough is error detection, not error correction.</i> When the walkthrough is finished, the author of the work product is responsible for taking the necessary actions to correct the errors. The author may hold private conversations with reviewers or conduct follow-up meetings to discuss potential solutions.</p> <p>Structured walkthroughs should be conducted during all stages of the software lifecycle. Walkthroughs can be conducted in various formats, with various levels of formality, and with different types of participants. In some cases, it might be useful and expedient to include software users in walkthroughs. Management representatives do not participate in structured walkthroughs. Regardless of the variations in format and participants, the basic activity (peer review) and the major objectives (find errors and improve quality) of the structured walkthroughs remain the same.</p>
General	Structured walkthroughs are appropriate for reviewing the technical

Information: accuracy and completeness of software development and maintenance work products, project management tools, and other types of documents (e.g., technical operating procedures). The walkthroughs should be scheduled to review small, meaningful pieces of work. The progress made in each lifecycle stage should determine the frequency of the walkthroughs.

Benefits: Structured walkthroughs provide the following benefits.

- Save time and money by finding and correcting errors earlier in the lifecycle.
- Provide value-added input from reviewers with different technical backgrounds, experience, and expertise.
- Validate and improve the related lifecycle work products.
- Keep the project team informed of the development or maintenance progress.
- Provide professional growth to participants by giving them an opportunity to look at different development or maintenance methodologies and approaches.

Participants: Each participant in the structured walkthrough process has a specific role.

The **author** of the work product is responsible for requesting the walkthrough when a meaningful portion of the product has been developed and is free from casual errors (e.g., spelling errors). The author attends the walkthrough as an observer and answers reviewers general questions. The author is not a reviewer.

The **presenter** usually develops the agenda for the walkthrough and presents the work product being reviewed. The presenter should be familiar with the work product and be a member of the project team.

The **moderator** facilitates the walkthrough session, ensures that the walkthrough agenda is followed, and encourages the participation of all reviewers. The moderator may also be the scribe.

The **reviewers** evaluate the work product to determine if it is technically accurate. The reviewers also assess whether the project guidelines or standards are being followed, the project requirements are met, and the product is properly prepared.

- Participants, continued:*** The **scribe** takes notes during the walkthrough. The scribe records the errors identified and any other technical comments, suggestions, and unresolved questions. The scribe should not be a reviewer.
- Meeting Record:*** The Structured Walkthrough Meeting Record worksheet is available to assist the reviewers with recording errors found prior to the walkthrough session, and for the scribe to record information discussed during the walkthrough. The worksheet is divided into two parts: Part 1 is used to record administrative meeting information; Part 2 is used to record reviewer comments, questions, and follow-up action items. A template of the worksheet is provided as an attachment to this procedure.
- Implementation:*** This procedure describes a formal structure for conducting walkthroughs. The formality and structure of the walkthrough sessions should be tailored to meet the needs of the development or maintenance team, and the purpose and scope of the work product.

Author's Responsibilities: The author of the work product is responsible for the following activities prior to the walkthrough session.

Step	Activity
1	Complete a meaningful segment of a work product. Avoid requesting a walkthrough on an incomplete segment or on a segment(s) that is too large to be adequately reviewed in less than 2 hours.
2	Proofread work product segment to eliminate nontechnical errors such as spelling or typographical mistakes. Nontechnical errors can distract reviewers from the technical aspects of the work product.
3	Notify the presenter that a completed segment of a work product is ready for a structured walkthrough. The author may discuss potential reviewers with the presenter.
4	Prepare any support materials (such as flow charts) to assist reviewers with their understanding of the entire work product and how the segment being reviewed fits into the entire product.
5	Provide the work product and all support materials to the presenter for advance distribution to the reviewers.
6	When the segment to be reviewed is finished, the author should be prepared to work on other segments of the work product (or other project tasks) while waiting for the walkthrough to occur.

***Presenter's
Responsibilities:***

The presenter is responsible for the following activities prior to the walkthrough session.

Step	Activity
1	Determine if the size of the work product segment is appropriate for one walkthrough session. The duration of a walkthrough session should not exceed 2 hours. If more time is necessary, the work product segment should be divided into smaller portions and each portion reviewed separately.
2	Select reviewers who are appropriate for the work product; such as systems analysts, programmers, technical writers, and testers. Reviewers should include people on and off the project. In some cases, the participation of software users may be considered desirable. If necessary, the presenter can discuss who should participate in the walkthrough with the manager of the project team.
3	Select the moderator and the scribe. Determine whether the scribe will be responsible for completing the Structured Walkthrough Management Summary Report.
4	Schedule the meeting date, time, and location. Notify all participants of these arrangements at least 2 days prior to the walkthrough.
5	Establish the agenda. Review the agenda and any important issues with the moderator.
6	Provide reviewers with copies of all materials to be reviewed at least 2 days prior to the walkthrough. The review package should include a blank copy of the Structured Walkthrough Meeting Record worksheet for optional use by reviewers.

Reviewers' Responsibilities: The reviewers are responsible for the following activities prior to the walkthrough session.

Step	Activity
1	Carefully review the materials provided by the presenter. Make a note about the amount of time spent reviewing the material. Give this information to the scribe at the beginning of the walkthrough session.
2	Identify technical errors. Insert comments and questions directly on the review materials or on part 2 of the Structured Walkthrough Meeting Record worksheet for easy reference during the walkthrough discussion.
3	Note directly on the review materials any nontechnical errors found during the review, such as spelling or typographical mistakes. While these errors are not discussed during the walkthrough, they should be provided to the author at the conclusion of the walkthrough.
4	Notify the presenter immediately if the reviewer will not be able to complete the review in time for the walkthrough session. An unprepared reviewer will hinder the walkthrough process. If enough time is available, the presenter can select a new reviewer.
5	Review the procedures for the structured walkthrough process. Each reviewer should be familiar with the procedures prior to participating in a walkthrough session.

***Moderator
and Scribe
Responsibilities:***

The moderator and scribe are responsible for the following activities prior to the walkthrough session.

Step	Activity
1	Review the materials provided by the presenter to become familiar with the contents.
2	Review the agenda and discuss any questions with the presenter.
3	Note directly on the review materials any nontechnical errors found during the review, such as spelling or typographical mistakes. While these errors are not discussed during the walkthrough, they should be provided to the author at the conclusion of the walkthrough.
4	Review the procedures (groundrules) for the structured walkthrough process. Clarify specific roles and responsibilities with the presenter. The moderator and scribe should be familiar with the procedures prior to participating in a walkthrough session.

Moderator's Responsibilities: The moderator is responsible for the following activities during the walkthrough session.

Step	Activity
1	Call the walkthrough session to order. It is important to start the session at the scheduled time.
2	Ask participants to introduce themselves and state their current responsibility/job assignment.
3	Briefly review the procedures and agenda for the walkthrough session.
4	<p>Facilitate the walkthrough session. Every attempt should be made to adhere to the agenda and the established meeting procedures.</p> <p>Encourage active participation of all reviewers. Limit discussion to the identification of errors. The discussion of solutions is not part of the walkthrough process. Limit the author's participation to observation and answering questions.</p> <p>If the session exceeds 2 hours, the moderator should stop the session at a logical breaking point and schedule another session to continue the discussion. When walkthrough sessions exceed 2 hours, the productivity and attention span of the reviewers will be adversely affected.</p>

***Moderator's
Responsibilities,
continued:***

Step	Activity
5	<p>At the conclusion of the session, ask the reviewers to make a decision about the status of the work product as follows:</p> <ul style="list-style-type: none">A Accept product as isB Revise--no further walkthroughs for this productC Revise and schedule another walkthrough <p>A majority opinion decides the action. If a majority opinion or consensus cannot be reached, the presenter will make the decision.</p> <p>If another walkthrough is necessary, the entire structured walkthrough process should be repeated.</p>
6	<p>Adjourn the walkthrough session at the scheduled time. If the agenda has not been completed, schedule a follow-up session.</p>

***Presenter's
Responsibilities:***

The presenter is responsible for the following activities during the walkthrough session.

Step	Activity
1	Provide a brief overview of the work product.
2	If necessary, review outstanding issues from previous walkthrough(s).
3	Present the product to be reviewed. Answer reviewers' questions. The presenter can ask the author for assistance in answering questions.
4	<p>At the conclusion of the meeting, if the reviewers cannot reach consensus about the status of the work product, the presenter is responsible for making that decision.</p> <p>The status will be one of the following:</p> <ul style="list-style-type: none">A Accept product as isB Revise--no further walkthroughs for this productC Revise and schedule another walkthrough

Scribe's Responsibilities: The scribe is responsible for the following activities during the walkthrough session.

Step	Activity
1	Record the beginning time for the walkthrough session.
2	Record the attendance of each participant.
3	Record the amount of time each reviewer spent reviewing the work product.
4	Record the technical errors identified by the reviewers. Record all significant comments and suggestions made by the reviewers and presenter.
5	Record suggested action items and other follow-up activities.
6	Record the end time for the walkthrough session.

Reviewers' Responsibilities: Each reviewer is responsible for the following activities during the walkthrough session.

Step	Activity
1	Provide the scribe with the time spent reviewing the work product.
2	Provide the appropriate introduction information (e.g., name and current job responsibilities).
3	Describe technical errors found during review of the work product. Be an active participant.
4	Ask questions as needed to clarify information about the work product.
5	Make constructive suggestions and comments about the work product.
6	<p>Participate in the decision about the status of the work product:</p> <ul style="list-style-type: none">A Accept product as isB Revise--no further walkthroughs for this productC Revise and schedule another walkthrough <p>If consensus cannot be reached by the reviewers, the presenter is responsible for making the decision.</p>
7	Inform the author about any nontechnical errors found during the review by providing a marked up copy of the review package.

Scribe's Responsibilities: The scribe is responsible for the following activities after the walkthrough has taken place.

Step	Activity
1	Prepare the meeting record for the walkthrough session. Include any action items identified by the reviewers and the person/team responsible for completing each action item.
2	Circulate the meeting record to the participants for their review and comments.
3	Update the meeting record as needed. Distribute the revised meeting record to the author. Copies of the meeting record should be distributed to the other participants only if an additional walkthrough is required.

Reviewers' Responsibilities: The reviewers are responsible for the following activities after the walkthrough.

Step	Activity
1	Review the walkthrough session meeting record for accuracy and completeness.
2	Indicate changes that are needed to add or clarify information in the meeting record. Submit any changes to the scribe. If necessary, discuss discrepancies with the presenter.
3	If requested by the author of the work product, provide additional explanation of walkthrough comments.

***Presenter's
Responsibilities:***

The presenter is responsible for the following activities after the walkthrough.

Step	Activity
1	Review the walkthrough session meeting record for accuracy and completeness.
2	Indicate changes to the meeting record and return to scribe. If necessary, discuss discrepancies with the reviewers.
3	Initiate follow-up activities recommended by the reviewers. Verify that all action items have been assigned to the appropriate person/team.
4	<p>Complete a Structured Walkthrough Management Summary Report. Include the following information:</p> <ul style="list-style-type: none"> • Description of the work product reviewed. • Description of findings. In addition to findings, include significant problems that would cause schedule slippage or project cost increase. • Date, time, and duration of the walkthrough. • List of attendees. • Status decision (i.e.; accept as is, revise--no further walkthrough, or revise and schedule another walkthrough) and any other follow-up activities.
5	Distribute copies of the Structured Walkthrough Management Summary Report to the appropriate management personnel including the Project Manager and the Quality Assurance Team Manager.
6	Track progress made on open action items. As action items are closed, indicate closed status on the meeting record.
7	If necessary, schedule a follow-up walkthrough when the revised work product is ready.

***Author's
Responsibilities:***

The author is responsible for the following activities after the walkthrough.

Step	Activity
1	Make all necessary changes to the work product.
2	Use the structured walkthrough meeting record as a checklist to make sure all errors are corrected, reviewers comments have been addressed, and open issues are investigated.
3	Check with the presenter and reviewers, as needed, to obtain additional information or clarifications.
4	Conduct follow-up meetings with subject matter experts, as needed, to complete work product.
5	Prepare work product and participate in follow-up walkthrough, if required.

**Quality
Assurance
Team Manager:**

The Quality Assurance Team Manager is responsible for the following activities after the walkthrough.

Step	Activity
1	Prepare a summary of the information contained in the Structured Walkthrough Management Summary Report.
2	Distribute the summary to the Technical Monitor for the software engineering task. The data presented in the report is included in monthly management reports.

**Project
Manager:**

The Project Manager is responsible for the following activities after the walkthrough.

Step	Activity
1	Review the Structured Walkthrough Management Summary Report.
2	If a problem exists that would cause a schedule slippage or project cost increase, send written notification to the project's Technical Monitor. An electronic mail message is an acceptable form of notification.
3	File the Structured Walkthrough Management Summary Report in the project management notebook/files.
4	Follow up on any action items that remain open. A formal plan may need to be developed for action items that cannot be resolved during the current lifecycle stage.

***Project
Technical
Monitor:***

The Project Technical Monitor is responsible for the following activities after the walkthrough.

Step	Activity
1	Review the summary information about the completed structured walkthroughs that is provided by the Quality Assurance Team Manager.
2	The Technical Monitor reports walkthrough statistics to appropriate levels of DOE senior management.

***Preparation of
Summary
Report:***

The presenter is responsible for the preparation of the Structured Walkthrough Management Summary Report (Summary Report). The presenter may ask the scribe to prepare the report. If the scribe prepares the report, the presenter reviews the report before it is distributed. A sample Summary Report is provided at the end of this appendix.

The Summary Report is distributed to the appropriate project personnel including:

- Project Manager
- Quality Assurance Team Manager

The Summary Report is used by the Quality Assurance Team to maintain statistical data on structured walkthroughs.

The Summary Reports generated during each stage of the software lifecycle will be checked during the In-Stage Assessments (ISAs). The purpose of the ISA check is to verify that structured walkthroughs were conducted during each lifecycle stage, that the walkthrough action items were documented, and that the action items have been properly resolved and closed.

***Follow-up
Walkthrough:***

If a follow-up walkthrough is required, the procedures used in the original walkthrough should be repeated. Use the meeting record from the previous walkthrough as a checklist to confirm that the previously identified errors and issues were resolved.

Introduction: Structured walkthroughs are generally used to review software products or systems under development or maintenance at various lifecycle stages. This section describes the work products that should be reviewed at each stage of the lifecycle. The work products correspond to the deliverables described in the *Department of Energy Software Engineering Methodology*.

Planning Stage: The Planning Stage defines the work to be accomplished for a development or maintenance task and estimates the resources that will be required. During the Planning Stage, a structured walkthrough should be conducted for each project management tool.

Purpose	Participants
<p>Reviews the project management tools for the project, such as the following:</p> <ul style="list-style-type: none">• Feasibility Study/Statement• Project Plan• Deliverables log• Milestone schedule• Work Breakdown Structure• Software Quality Assurance Plan	<p>The developer and at least one systems analyst, preferably outside the project.</p> <p>If the project involves telecommunications (e.g., LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>

**Requirements
Definition Stage:**

The Requirements Definition Stage determines the scope and requirements for a development or maintenance project. During the Requirements Definition Stage, structured walkthroughs are used to identify problems, inaccuracies, ambiguities, and omissions in the Requirements Specifications.

Purpose	Participants
<p>Reviews the following project work products:</p> <ul style="list-style-type: none">• Configuration Management Plan• Requirements Specification<ul style="list-style-type: none">- Client goals- Data requirements- Functional requirements- Performance requirements- Interface requirements- Telecommunications- Computer security• Continuity of Operations Plan• Project Test Plan• Acceptance Test Plan	<p>One or more of the project designers and at least one systems analyst.</p> <p>If the project involves telecommunications (e.g., LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>

**Functional
Design Stage:**

The Functional Design Stage selects the design elements that determine how the software product will be constructed to meet the functional requirements. During the Functional Design Stage, the structured walkthroughs are used to identify flaws, weaknesses, errors, and omissions in the architecture of the design.

Purpose	Participants
<p>Reviews the Functional Design Document, logical model, data dictionary, and requirements traceability matrix for errors in the following design areas:</p> <ul style="list-style-type: none">• Hardware• Software• Logical design• Telecommunications• System interfaces• Backup and recovery• Security• User interface• Reports	<p>At least one systems analyst and one or more of the project designers/programmers.</p> <p>If the project involves telecommunications (e.g., LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>

System Design Stage:

The System Design Stage uses the concepts and the system architecture to describe the system components in detail. During the System Design Stage, structured walkthroughs are used to review detailed specifications, and plans that address testing and implementation issues.

Purpose	Participants
<p>Reviews the following work products:</p> <ul style="list-style-type: none">• Physical Model• Programming Standards• Program Specifications• System Design Document• Conversion Plan• Integration Test Plan• System Test Plan	<p>At least one systems analyst and one or more of the project designers/programmers.</p> <p>If the project involves telecommunications (LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>

Programming Stage:

The Programming Stage involves the construction of the software product and the testing that is an integral part of the construction process. During the Programming Stage, walkthroughs are conducted on clean compiles, test data bases, and the operating documentation.

Purpose	Participants
<p>Reviews listing (clean compiles) for approximately 80 hours of coding, or at the completion of a logical unit of work. Reviews should verify adherence to the following:</p> <ul style="list-style-type: none">• System design• Programming standards• Program Specifications• Software Configuration Management Plan	<p>Technical personnel with appropriate expertise and at least two additional reviewers. The entire programming team might attend the walkthrough, depending on the approach.</p> <p>If the project involves telecommunications (e.g, LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>
<p>Determines the adequacy of the Integration and System test data base and test plans.</p>	

***Software
Integration and
Testing Stage:***

The Software Integration and Testing Stage is the transition from individual software components to an integrated software product. During the Software Integration and Testing Stage, structured walkthroughs are used to test the integrated product, check the accuracy of the operating documents that will be provided to the user(s) and maintenance programmer(s), and plan for the acceptance activities.

Purpose	Participants
<p>Reviews the following documents:</p> <ul style="list-style-type: none"> • Integration and System Test Results/Reports • Users Manual • Programmers Reference Manual • Installation Plan • Acceptance Test Plan • Training Plan • Preacceptance Checklists 	<p>Participants include personnel with appropriate technical expertise and a technical writer.</p> <p>If the software product is an application on a mainframe platform, include a representative from Computer Operations.</p> <p>If the project involves telecommunications (e.g., LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>
<p>Reviews the following production activities:</p> <ul style="list-style-type: none"> • Data conversion • Installation procedures 	

Installation and Acceptance Stage:

The Installation and Acceptance Stage is the transition from a software product in development to a product or system in full production status. During the Installation and Acceptance Stage, structured walkthroughs are used to check the Acceptance Test Report and inspect the plans for activities performed in preparation for full-scale production.

Purpose	Participants
<p>Reviews the following documents:</p> <ul style="list-style-type: none">• Acceptance Test Results/Report• Acceptance Checklist	<p>Participants include personnel with appropriate technical expertise.</p> <p>If the software product is an application on a mainframe platform, include a representative from Computer Operations.</p> <p>If the project involves tele-communications (e.g., LAN or dial-up), include a representative from the appropriate functional area.</p> <p>If the project involves classified data or sensitive unclassified data, include a representative from the appropriate computer security program.</p>
<p>Performs the following production activities:</p> <ul style="list-style-type: none">• Data conversion• Installation procedures	

Types of Documents:

Structured walkthroughs are appropriate for reviewing other types of documents, such as the following:

- Departmental and contractual publications
- Long-range plans
- Administrative and technical operating procedures
- Technical reports
- Presentations

Types of Verification:

When reviewing other types of documents, structured walkthroughs are used to verify the technical and editorial accuracy and appropriateness of the content and format.

Purpose	Participants
<p>Reviews for accuracy including the following:</p> <ul style="list-style-type: none">• Consistency• Completeness• Conformance to standards and guidelines• Style• Grammar and spelling	<p>Technical experts, technical writer, and graphics expert.</p>

Structured Walkthrough Meeting Record

Part 1: Structured Walkthrough Meeting Information

Complete the following blocks to record the structured walkthrough meeting information. If you have any questions, call your Quality Assurance Team representative.

Walkthrough Information	Participant Information		
	Participant Name/ Responsibilities	Preparation Time	Present (✓)
Project name:	Author:		
Walkthrough date:	Presenter:		
Walkthrough start time:	Moderator:		
Walkthrough end time:	Scribe:		
Walkthrough work product decision:	Reviewer:		
<input type="checkbox"/> Acceptable as presented	Reviewer:		
<input type="checkbox"/> Acceptable with revisions	Reviewer:		
<input type="checkbox"/> Revisions with another walkthrough	Reviewer:		
If a follow-up walkthrough is required:	Reviewer:		
Date: Location: Time:	Reviewer:		

Continued on next page

Structured Walkthrough Meeting Record

Part 2: Structured Walkthrough Findings

Record reviewer comments and action items identified during the structured walkthrough in the blocks below. If more space is needed, make additional copies of this page.

[illegible]

Structured Walkthrough Management Summary Report

Product Name:			
Product/Module Number:		Acronym:	
Work Product (check one)			
<input type="checkbox"/> Feasibility Study/Statement <input type="checkbox"/> Project Plan <input type="checkbox"/> Software Quality Assurance Plan <input type="checkbox"/> Software Configuration Management Plan <input type="checkbox"/> Continuity of Operations Plan/Statement <input type="checkbox"/> Data Dictionary <input type="checkbox"/> Requirements Traceability Matrix <input type="checkbox"/> Software Requirements Specification <input type="checkbox"/> Project Test Plan <input type="checkbox"/> Acceptance Test Plan <input type="checkbox"/> Design Methodology <input type="checkbox"/> Logical Model <input type="checkbox"/> Functional Design Document <input type="checkbox"/> Physical Model	<input type="checkbox"/> Integration Test Plan <input type="checkbox"/> System Test Plan <input type="checkbox"/> Conversion Plan <input type="checkbox"/> System Design Document <input type="checkbox"/> Program Specifications <input type="checkbox"/> Programming Standards <input type="checkbox"/> Acquisition Plan <input type="checkbox"/> Installation Plan <input type="checkbox"/> Source Code <input type="checkbox"/> Transition Plan <input type="checkbox"/> Users Manual <input type="checkbox"/> Programmers Reference Manual <input type="checkbox"/> Training Plan <input type="checkbox"/> Other (specify):		
Description of Product Reviewed:			
Summary of Findings: (Include significant problems that would cause schedule slippage or project cost increase).			
Date:	Start Time:	End Time:	Duration:
Presenter: _____ Moderator: _____ Scribe: _____		Reviewers: _____ _____ _____	
Decision: A = Accept product as is B = Revise--no further walkthrough for this product C = Revise and schedule another walkthrough Enter appropriate letter: _____			